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Internal Letter

Rockwell International

Date: June 30, 1989

No.: SO 89-36

TO (Name, Organization, Internal Address)

W. F. Weston
Plutonium Operations
Building 111

FROM (Name, Organization, Internal Address, Phone)

D. W. Ferrera
Support Operations
Building 111
5008

SUBJECT: UV/PEROXIDE TREATMENT UNIT
REMEDIAL ACTION 881 HILLSIDE

The procurement of the Ultraviolet Light/Hydrogen Peroxide ground water treatment unit is currently on hold awaiting the definition of influent and effluent characteristics. This information was requested by Facilities Engineering on May 11, in writing. The reply from the RCRA/CERCLA group, dated May 16, stated that the information would be available in 2-4 weeks. Engineering has not yet received this data and as a result, the procurement of the UV/Peroxide treatment unit continues to be delayed.

Please provide this information to Facilities Engineering as soon as it becomes available.

DW Ferrera

D. W. Ferrera, Acting Director
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DEMONSTRATION PROJECT FOR THE 881 HILLSIDE

Statement of Work

The water decontamination project for the 881 Hillside will evaluate the effectiveness of using an ultraviolet light/hydrogen peroxide (UV/H_2O_2) unit combined with a french drain/extraction well/sump system to treat groundwater contaminated with hazardous organic substances. The compounds of concern include methylene chloride ($MeCl_4$), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), carbon tetrachloride (CCl_4), trichloroethene (TCE), toluene, tetrachloroethene (PCE), and trans-1,2-dichloroethene (t-1,2-DCE). When the water from the french drain, extraction well and sump are combined, the concentrations for these compounds may total in the low ppm (parts/million) range. Regulatory limits for these compounds are as low as 5 ppb (parts/billion). In addition, the State of Colorado has proposed groundwater standards for two of these compounds that are in the ppt (parts/trillion) range (e.g., t-1,2-DCE [0.03 ppb] and PCE [0.8 ppb], although the technology (e.g., GC/MS) to confirm these concentrations is currently unavailable.

A vendor conducted laboratory analysis, performed using contaminated groundwater, found that a UV/H_2O_2 process could effectively degrade the chlorinated hydrocarbons in the groundwater. The results were comparable to those expected using well-accepted technologies such as air stripping and carbon adsorption. Because there was no substantial difference (i.e., costs, efficiency, etc.) between air stripping, carbon adsorption, and UV/H_2O_2, the latter was chosen, in the Remedial Investigation/Feasibility Study (RI/FS), because the compounds were destroyed without air emissions (air stripping) or creating a hazardous or mixed waste (carbon adsorption).

The demonstration project will have several components. The first component will be the UV/H_2O_2 unit. This will be placed in an existing building on plantsite. The second component is the french drain. This drain will be excavated to a level that ensures that the invert penetrates a minimum of 2 feet into claystone bedrock. The third component is the #9-74 extraction well. This will replace the existing #9-74 well. The highest concentrations of contaminants have been found in samples from this well. Next is the sump used to collect and rout the discharge from the Building 881 footing drain to the treatment building. The last component of the project will be the infiltration gallery. Treated water exiting the treatment unit will be reinjected using the infiltration gallery. Surge tanks, piping, pumps, utilities, etc. will be added as needed for the demonstration.

The project will test the ability of the treatment unit to decontaminate groundwater to regulatory limits (ARARs listed in the FS), while at the same time testing the ability of the french drain to effectively collect contaminated groundwater, thus preventing the further expansion of the plume. Currently, the only data, excluding the literature, supporting the selection of the UV/H_2O_2 unit is from the test cited above.

The project will have to show compliance with several regulatory requirements, including DOE Orders 5480, 5700.6B, the Comprehensive

Environmental Response, Compensation and Liability Act (CERCLA) of 1980, and the Superfund Amendments and Reauthorization Act (SARA) of 1986.

Costs

The cost estimate listed below for the treatment system was generated during design of a full-size operation.

FY 1989

The costs for FY 1989 will include acquisition and setup of UV/H_2O_2 equipment, construction of the water collection system and infiltration gallery, and operation of the demonstration plant. A building is currently available. Construction of the collection and reinjection systems, and purchase of the treatment unit is estimated to cost $900,000, manpower (1.5 man years) approximately $200,000, plus an additional $125,000 for contingencies, for a total of $1,225,000.

FY 1990

The bulk of the testing should be completed by FY 1990. Therefore, costs will be primarily for manpower to demonstrate the process to others, report preparation, and other miscellaneous activities. During this time, an estimated 1.5 man years would be needed at a cost of approximately $200,000. With an additional $50,000 for contingencies, the total becomes $250,000.

Schedule

Following is a tentative schedule.

Phase 1 (3 Months)

First Quarter, Fiscal 1989: This period will be used for completing the design review and construction package, vendor selection, specifications for government supplied equipment system, and development of a QA/QC plan, including coordination with and input from affected RFP organizations.

Phase 2

Laboratory testing, by a vendor, of the UV/H_2O_2 was completed in FY 1988. The testing was performed to support the decision process required for selecting a treatment system in the FS.

Phase 3

Not applicable.

Phase 4 (3 Months)

Second Quarter, Fiscal 1990: This period will be used for construction of the waster collection system, fabrication of the UV/H_2O_2 equipment, and initial testing and start-up of the water decontamination process. This phase will be used to demonstrate the feasibility of using

UV/H_2O_2 with a water collection system to decontaminate groundwater containing hazardous organic contaminants, at RFP and, possibly, other DOE facilities.

Phase 5 (3 Months)

To be determined.

The major milestones are: (1) completion of process design and QA/QC plan; (2) fabrication of treatment unit, and completion of water collection and reinjection systems; (3) completion of demonstration tests; (4) completion of report detailing results of demonstration tests. If the results of the testing do not support the choice of UV/H_2O_2 as the water treatment process, then another process such as air stripping or carbon adsorption may be selected as a replacement.